

## ABSTRACT

## Multi-user detection method

Multi-user detection method with elimination of interference between users, each user transmitting modulated data in the form of symbols on a transmission channel, each transmission channel ( $k$ ) comprising at least one propagation path ( $p$ ) and each propagation path arriving at an array of reception antennae ( $\ell$ ) in a direction of arrival  $\theta_{p,k}$ , the method comprising at least one sequence of steps for each user, each sequence comprising:

- (a) a step of estimating the signal transmitted (500<sub>k</sub>,600<sub>k</sub>,700<sub>k</sub>,800<sub>k</sub>,900<sub>k</sub>,900,1000) by the user from the antennae signals, the said step effecting an estimation (530<sub>p</sub>) of the direction of arrival ( $\theta_{p,k}$ ) and characteristics ( $\alpha_{p,k}$ ,  $\nu_{p,k}$ ) of propagation of each path ( $p$ ) of the transmission channel ( $k$ ) from the said signals;
- (b) a step of estimating the data transmitted (610<sub>k</sub>,710<sub>k</sub>,810<sub>k</sub>,910<sub>k</sub>,910,1010) by the user from the said estimation of the signal transmitted;
- (c) a step of estimating the contribution (670<sub>k</sub>,770<sub>k</sub>,870<sub>k</sub>,970<sub>k</sub>,970,1070) of the user to the signals received by the different antennae from the data estimated at step (b) and the direction of arrival as well as the propagation characteristics estimated at step (a);
- (d) an interference elimination step (680<sub>k</sub>,780<sub>k</sub>,880<sub>k</sub>,980<sub>k</sub>,980,1080) subtracting from the antennae signals the contribution estimated at step (c) in order to obtain cleaned antennae signals; the cleaned antennae signals supplied by at least a first sequence being used as antennae signals by at least a second sequence.

Fig. 6